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Production of Carrots

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PRODUCTION OF CARROTS

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History and Importance

Carrots were introduced into this country during the early colonization period and soon became a staple garden crop. They had been used in European countries for a long time prior to the discovery of America. The work of nutrition specialists has greatly stimulated the use of the carrot as a food, and while its culture does not compare in extent with that of some other vegetable crops, it must be included in the list of first-rank truck- and market-garden vegetables.

Carrot production is of two general classes—the northern or summer crop, considerable quantities of which go into storage, and the southern or winter crop, which appears on the markets during the winter in the form of bunched carrots. According to statistics contained in the 1936 Yearbook of the Department of Agriculture, approximately 37,000 acres were planted to carrots during the season of 1935. The production is estimated at upward of 13,000,000 bushels. The State of New York leads in the production of main-crop carrots, the shipments from that State averaging nearly 1,600 cars annually, although during several years it has exceeded 2,000 cars. California leads in the production of bunched carrots, having shipped 9,452 cars during the 1934 season. In 1924 California shipped only 157 cars; there has therefore been a gain of over 9,000 cars in 10 years. During 1934 Texas ranked second and Arizona third in the production of early bunched carrots, but Arizona shipped more than Texas in 1935.

Climatic Adaptation

The carrot succeeds under a wide range of climatic and soil conditions and has high food value and good shipping and storage qualities. Production as a home-garden crop, in the market garden for disposal in nearby cities, and as a truck crop for shipment or for storage makes the carrot available throughout the entire year. As already noted, it is extensively grown in the South and on the Pacific coast as a winter crop for shipment, while in the North large areas are planted for summer marketing or for storage for winter. Few truck crops have a wider adaptation. Carrots are also extensively used for stock feeding.

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Soil, Commercial Fertilizer, and Manure

Soil for carrots must be fertile and of such texture that the roots can penetrate and develop without hindrance. Moisture supply to insure germination and normal development of the crop is essential. This is often supplied, in part at least, by irrigation, the crop usually having a sufficiently high acre value to justify this practice.

The carrot does not seem to be especially sensitive to the type of soil, so long as it is fertile, deep, and well supplied with moisture. The crop is grown on soils varying in character from light sandy loams to peats. Stiff, heavy land should be avoided, as it warms up slowly and also interferes with the germination of the seed and the development of the roots. Carrots from stiff or stony land are likely to be rough and unfit for the market. Irrespective of its type, the land selected should be capable of being plowed to a depth of not less than 8 and preferably 10 to 12 inches.

When manure is used it should be well-rotted, as coarse manure is likely to cause prongy, irregular roots. Many growers prefer to apply the manure to the preceding crop, and others disk it in while the land is being prepared. The carrot is a heavy feeder and has the reputation of being hard on the land. On muck and peat soils very liberal use should be made of potash. Experimental work carried on by the Division of Fruit and Vegetable Crops and Diseases with carrots on peat soil shows that applications of 500 to 600 pounds of muriate of potash per acre usually give profitable results. No general rule for the use of fertilizers on carrots can be given, but a broadcast application of from 1,000 to 2,000 pounds per acre of a mixture containing 5 to 6 percent of nitrogen, 6 to 8 percent of phosphoric acid, and 12 to 16 percent of potash is generally sufficient.

Varieties and Seed

Although hundreds of names are applied to the carrot by seedsmen, only a few varieties are of commercial importance. A list of 10 varieties probably includes all the sorts that are of importance. There is evidence to indicate that four of these—Chantenay, Danvers Half-Long, Coreless, and Nantes varieties—should meet practically all demands. Imperator and Morse Bunching are, however, important bunching varieties in California. High-grade strains of a few varieties are of greater importance than a long list of supposed varieties of doubtful worth.

The carrot-seed supply of this country is grown largely in California, where the climatic conditions are favorable for the production and curing of a good grade of seed. Carrot seed is small and very light in weight, 1 ounce containing from 17,000 to 18,000 seeds. Its germinating power is supposed to last about 5 years, but this depends very largely on the conditions under which it is stored. Like other seeds of this character, its germination is readily injured by moisture and

especially by extreme changes in the moisture content of the air. After the seed is once thoroughly dried, it should not be exposed to moisture-laden air but should be kept in a dry location and under reasonably uniform temperature. Good, well-developed, and properly cured carrot seed will frequently germinate above 95 percent; seed with 70-percent germination is regarded as the minimum that it is safe to use for planting.

Planting and Cultivation

For hand, wheel-hoe, or garden-tractor cultivation the rows are usually spaced from 16 to 24 inches apart. For horse cultivation the rows should be spaced from 30 to 36 inches apart. For the closer spacing, 3 pounds of seed per acre is required, and for horse cultivation 2 pounds will usually be sufficient. Sowing with a single-row hand drill or with a gang drill attached to a garden tractor gives excellent results. The depth of planting depends to some degree on the character of the soil and the moisture conditions at the time of planting, but covering about one-half inch deep is usually satisfactory. Using seed of high quality and spacing it carefully will obviate much of the work of thinning; however, if the seeding is too thin there may be difficulty in getting a satisfactory stand of plants.

Carrot plants are very delicate and grow slowly at first. Careful cultivation is essential, especially during the first few weeks. A certain amount of hand weeding is essential, but the thinning and hand weeding may often be combined. After the carrots begin to shade the ground little trouble is experienced with weeds directly in the rows. A wheel hoe, used by a careful person, is an excellent tool for controlling weeds in the rows, and the necessity of this hand work should always be kept in mind when determining the area to be devoted to carrots.

Thinning

It is extremely difficult to plant carrots so that thinning will not be required. In fact, in order to get a stand of plants it is usually necessary to sow a slightly greater quantity of seed than is actually required to give the desired stand. This calls for a certain amount of thinning; however, the number of plants that may be allowed to remain to each foot of row will depend to some extent on the character of the soil. On muck soils the carrots will stand more crowding than on heavier soils, for the reason that as the carrots expand in their growth the soil pushes away, giving the carrots room to develop. On clay loams and on heavier soils the resistance of the soil may prove sufficient to cause the carrots to overcrowd and become deformed. Where the carrots are properly thinned, the individual carrots will develop to larger size and approximately the same total yield will be secured. On muck soils it may be safe to allow as many as 12 to 15 carrots to remain to each foot of row, but on the heavier soils the number should be considerably less.

Diseases and Insect Enemies

Among the enemies which attack the carrot, mention should be made of bacterial soft rot, phoma root rot, alternaria black rot, leaf blight, the carrot rust fly, and the carrot beetle. Leaf blight and other leaf diseases of the carrot can be largely controlled by spraying the plants during the growing season with bordeaux mixture. The rots to which the carrots are subject, especially in storage, can be very largely controlled by keeping them at a low temperature and by proper moisture conditions in storage. For information on the control of these diseases and insects apply to the United States Department of Agriculture or to your State agricultural experiment station.

Harvesting and Marketing

The carrot crop is usually handled either as an early truck crop, marketed as bunched carrots (fig. 1), or as a late or storage crop which is topped and handled in bulk or in baskets, crates, sacks, or other containers. In harvesting the truck crop for market a pulling is often made which is in reality a thinning, leaving the remainder of the crop for further development. Bunch carrots are usually tied five to eight in a bunch, according to size, and washed. The late or storage crop is plowed out, topped, and placed in containers for handling. United States grades have been established as aids in marketing both bunch and bulk carrots. Description of these grades may be obtained by applying to the Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Packing and Shipping Bunched Carrots

Bunched carrots are packed largely in slat crates measuring 13 by 18 by 22 inches inside and holding 6-dozen bunches with the tops on. The crates are lined with a special crate-lining paper, and as the bunches of carrots are packed in the crates a quantity of finely crushed or "snow" ice is added. When the crates are properly filled and the tops nailed on, the crates will have a decided bulge. After the crates are loaded in the car a layer of crushed ice 6 to 8 inches thick is spread over the top of the load. No bunker ice is used for winter shipments unless they are to pass through warm territory; but, in addition to the top icing, the bunkers are filled with ice when shipments are made during hot weather.

In south Texas a smaller crate measuring 9 by 13 by 22 inches is frequently used for the shipment of bunched carrots.

Storage

Large quantities of carrots are stored and held for marketing in the fresh state for canning, for use in the making of soup, for stock

feeding, and for other purposes. Well-regulated cold storage is satisfactory, but good results may also be obtained in natural storage cellars or outdoor caves where they can be kept as cool as possible without freezing. Banks or pits are also employed for carrot storage. A moderately moist atmosphere is desirable, as dryness results in severe shriveling. The temperature should be kept near 32° to 34° F.

Yields and Returns

During recent years the average yield of carrots in the so-called early-crop States has been about 270 bushels per acre. In the North-

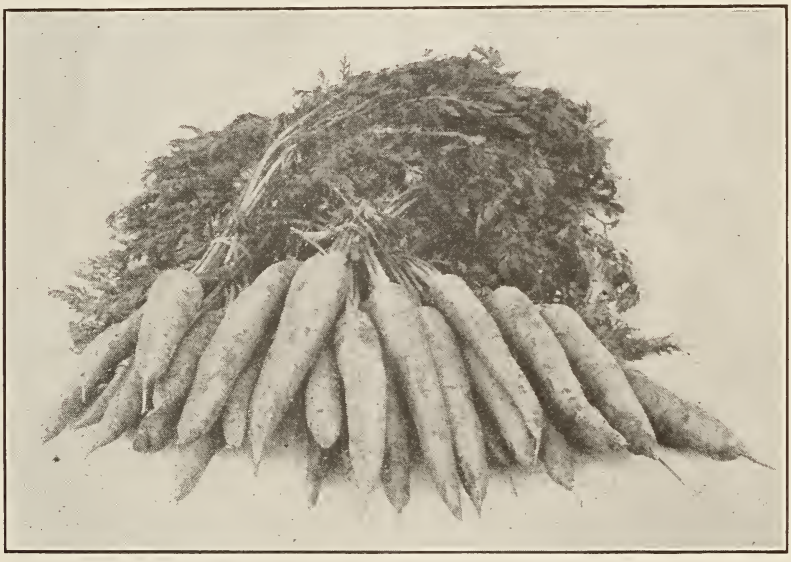

FIGURE 1.—Bunched carrots displayed on the market.

ern or late-crop States the yield has been about 400 bushels per acre. Prices paid have averaged about 60 cents per bushel. Although the gross returns per acre are higher than is commonly obtained from general farm crops, it should be remembered that the carrot crop is expensive to produce, as the labor costs are necessarily high and, moreover, that it demands land in a high state of fertility.

The demand for the carrot seems to remain strong, and the crop is worth the attention of market gardeners and truck-crop growers who are favorably situated for its production and marketing.

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